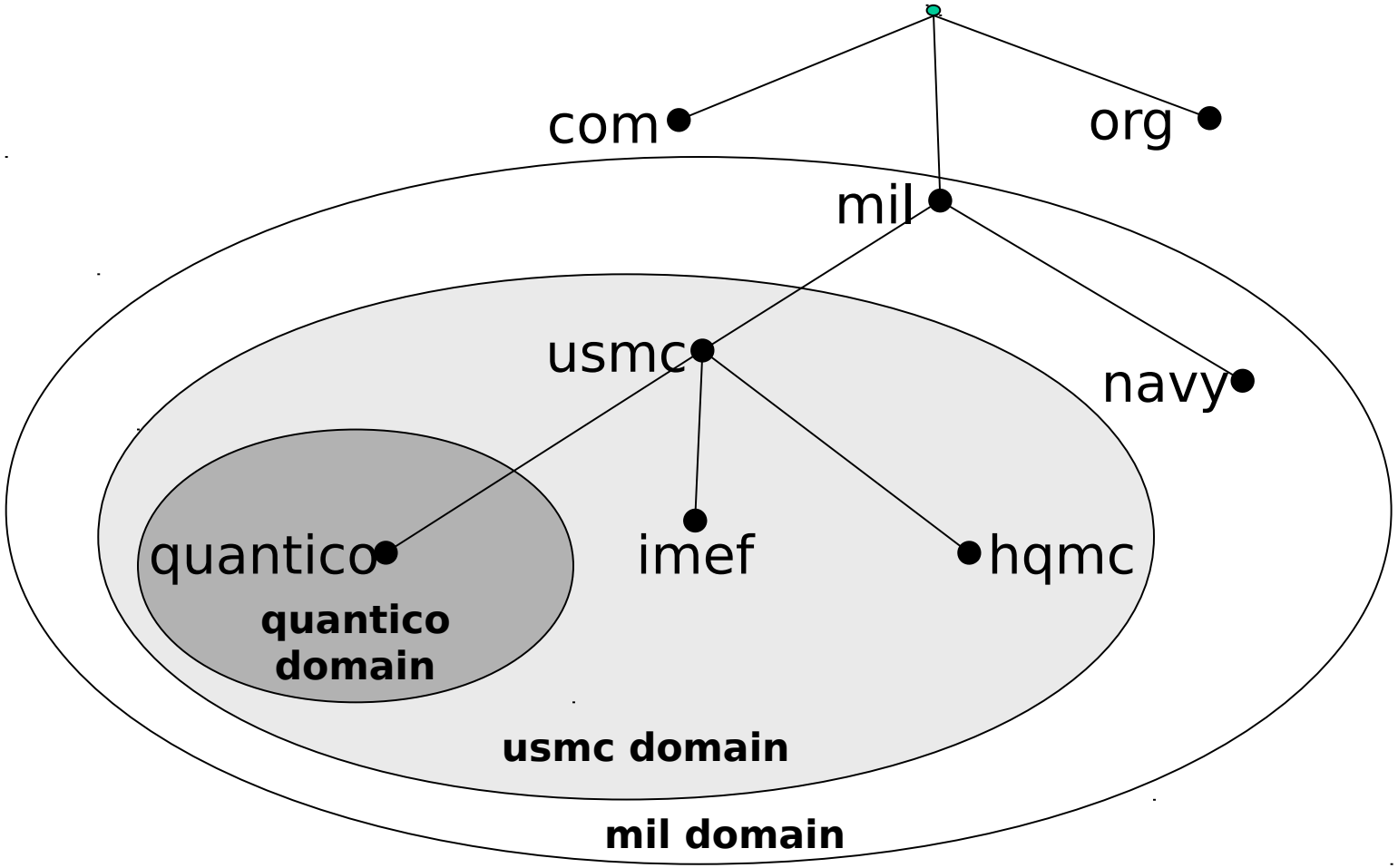
Domain Name Service (DNS)

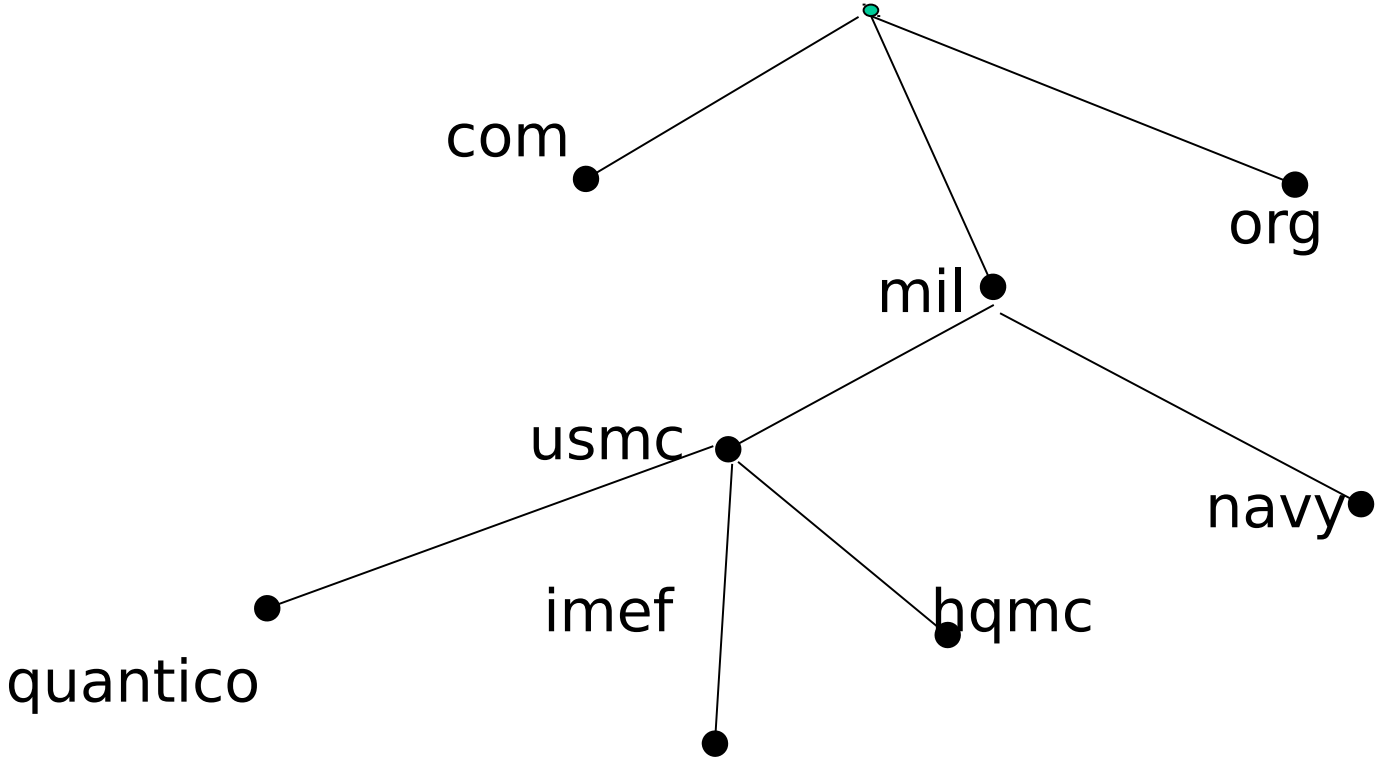
Domain

MSTP


com
org
mil
usmc
navy
quantico
imef
hqmc
quantico domain
usmc domain
mil domain

Subdomains

- Subdomains are completely relative.



Domain Names

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- Represent a **node** within the domain name space
- Identify a specific segment of the database.
- Each node has a label that can be up to 63 characters in length.
- The full domain name of any node is the sequence of labels on the path from that node to the root.
- Maximum of 255 characters.
- Valid characters: a-z, A-Z, 0-9, “-” **no underscores!**
- Contact the Marine Corps Network Operations Security Command (MCNOSC).

Domain Names

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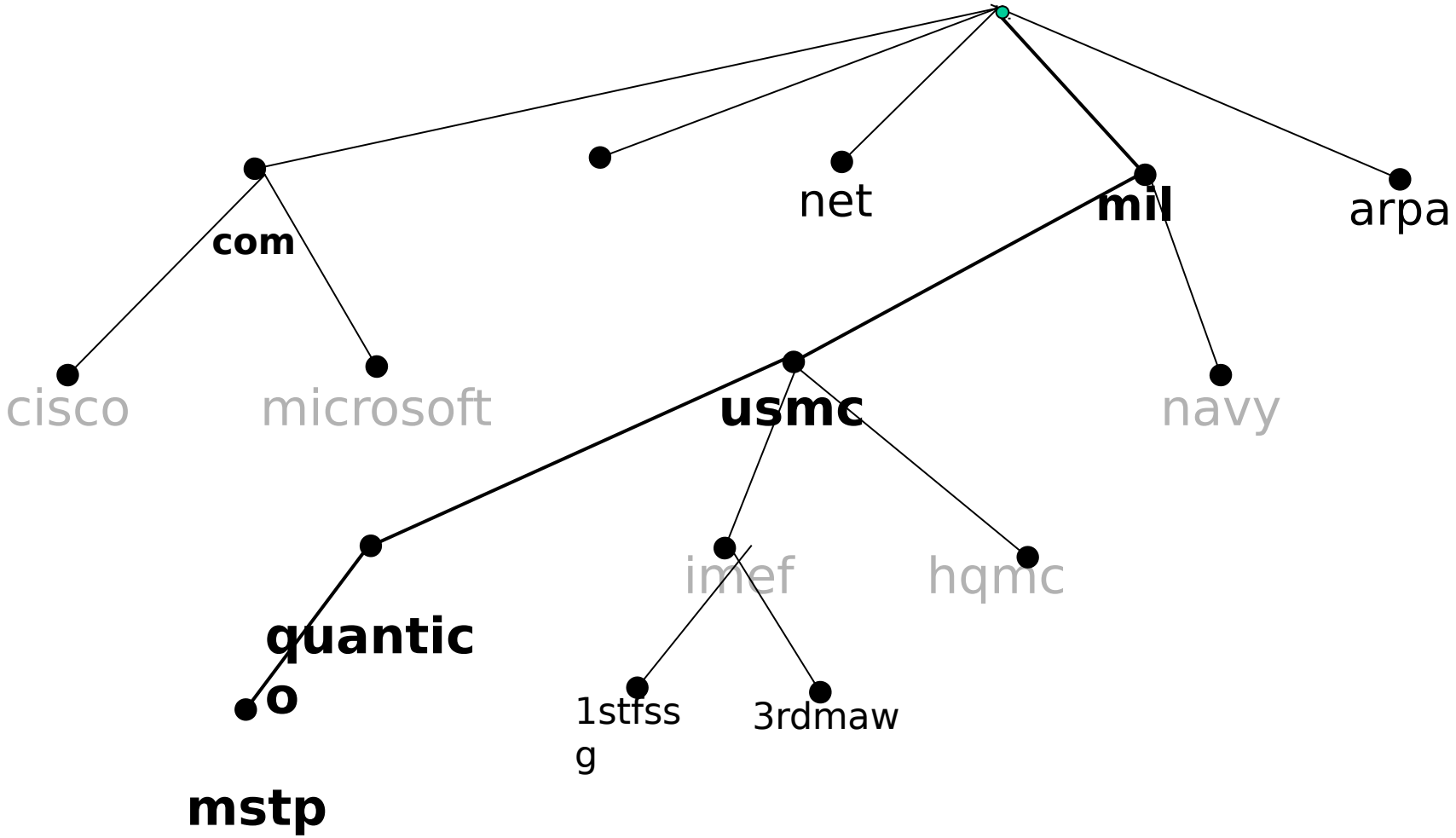

Mstp.quantico.usmc.mil.

Name Servers

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- The server component of DNS.
- Name servers have complete information about some part of the domain name space, known as a zone.
- Four Types
  - Primary: Start of Authority (SOA) for Zone
  - Master: Any DNS server that receives a request for records
  - Secondary: Receives zone information
  - Caching Only: Holds only cache.dns files

Primary name servers

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- Primary name servers act as the master database for the organization(s) that they serve.
- The database information is located in plain text files that follow a specific format used by the DNS program.
- These text files can be created, deleted, or modified directly within the primary name server's file system.

Secondary name servers

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- Provide a backup of the DNS database.
- Spread the load.
- Receive periodical updates to their database from a primary / master name server.
- The Secondary name servers' database cannot be created or modified directly.

Caching-only name servers

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- Caching-only name servers learn all their database information via queries made to the server.

- Caching-only are not authoritative for any portion of the DNS database.

Resolution

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- Name servers are capable of providing information about the domain name space.
- The process by which the name servers retrieve information about data is called name resolution.
- A name server can issue a query to a **root name server** for any name in the domain name space, and the root name server will start the name server on its way.

Root Name Servers

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- Root name servers can at least provide the names and addresses of the name servers authoritative for the top-level domain.

- These top-level name servers can then provide further details regarding the location of authoritative name servers for the domain in question.

Resolution

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- Simply put, DNS resolution is a matter of converting a workstation's host name into it's corresponding IP address.

- There are primarily two types of resolution:
  - host name to IP address (forward resolution)
  - IP address to host name (reverse resolution)

DNS Zones

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- Configuration of forward lookup zones and reverse lookup zones
- Forward lookup zone
  - Defined to resolve a name to an IP address
- Reverse lookup zone
  - Defined to resolve IP addresses to names
- The name server can resolve a query only for a zone for which it has authority
- A zone is a database file name that stores entries of the hostname to IP address

DNS and Resource Records

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- If DNS can not resolve request, it passes it to another name server
- DNS snap-in used to add resource records to the zone database
  - Other types of entries in the zone database file
  - Examples Start of Authority (SOA) or Name Server (NS) records
- DNS SRV records that are required for proper AD operation are
  - GC (Global Catalog)
  - Kerberos
  - LDAP (Lightweight Directory Access Protocol)

Dynamic DNS (DDNS)

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- Enables automatic updates to zone files by other servers or services
- Prior to 2000, DNS entries were static
- Server is configured with list of authorized servers
  - Secondary name servers, domain controllers, and other servers performing network registration of clients, such as DHCP or WINS

How DDNS Works

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- Every Windows 2003 computer attempts to register its A record (host record)
  - Provides the name-to-address mapping
- Registers the PTR record (pointer record)
  - Provides address-to-name mapping
- DHCP Client service generates DDNS update on 2003 computers whether or not DHCP client
- DDNS Interacts with DHCP Service to update A and PTR records for DHCP clients and does clean up when lease expires

DNS and Active Directory

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- Active Directory Integrated DNS

  -Resides in the active directory database (Domain Partition)

    -When using ADI zones the domain partition will not replicate zone information between zones. You must either setup secondaries of your ADI zone or use delegated zones.

  - Native communication within AD uses TCP/IP and therefore requires DNS for name resolution

  -Service records are dynamically registered in DNS so that clients can contact the appropriate servers in their site

DNS Zone Delegation

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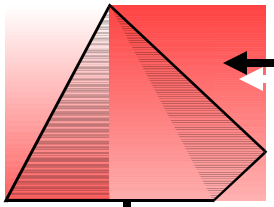
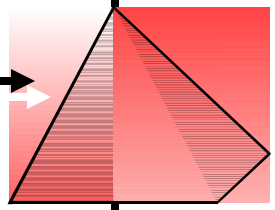


USMC.MIL
(Root zone)

Delegated to IIMEF DNS server

IIMEF will create a IIMEF zone



IIMEF zone

(not IIMEF.usmc.mil zone)

Delegated to 2FSSG DNS server

2FSSG will create a 2FSSG zone

2FSSG zone

(not 2FSSG.IIMEF.USMC.MIL zone)

****DNS Zone setup is best done while all servers are still in the same site.****

ADI Zone DNS

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Standard Zones vs. ADI Zones

- Static
- Single primary zone (read/write copy)
- Centralized control of DNS database and zone transfers
- Not reliant on AD
- Used by non-Windows 2003 DNS servers
- Fault tolerance & load balancing through use of

- Dynamic
- Multiple primaries
- Fault tolerance of primary zone
- Secure zone transfers and DDNS client updates
- Min. zone transfer traffic – depends on AD replication
- Can integrate with standard secondary

Active Directory Design

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- Don’t make the NETBIOS name and DNS names different
- Name the domain appropriately
- Don’t have conflicts with existing DNS structure
- If you integrate DNS and AD you still need a nominated DNS master
- Larger zones which span sites will generate more replication traffic if they are integrated with AD

Designing the Name Space

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- Basic emphasis--reduce the number of domains :
- Restrictions
  - Too many GPO’s will result in long log-on times
  - A domain tree cannot be renamed
  - You cannot remove the root forest domain without destroying the entire forest
  - The Schema Admin’s group exists only in the Forest Root Domain
  - Schema Changes are not reversible and cannot be deleted
  - Multiple domains cannot be hosted on a single domain controller
  - The Global Catalog is Global and therefore will replicate data everywhere and doesn’t contain any type of Regional or Site catalog

Designing the Name Space cont…

MSTP

- You should start the design with name space
  - Rough design of the physical design must be in place to finish the name space design
- Geographic, Network, Logical and organizational diagrams of the supported units are required for good planning

Overview Of The Design Process

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- Stage 1
  - Domain Name Space Design
    - Items to consider :
      - Number of Domains
      - Forest and tree structure
      - Client Naming convention
      - Network as a whole

Stage 1 cont...

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- Two objectives:
  - Design Active Directory to represent your Units
    - Geographically or Organizational
    - Distributed or Centralized Administration
  - Minimize the use of Domains by utilizing Organizational Units and Sites
    - Each Forest may contain 10 Million objects or more
    - No more than 1 or 2 million per domain is suggested
    - Each Domain can be partitioned using Organizational Units

Stage 1 cont...

MSTP

- Number of Domains
  - Step 1 Three reasons to create domains
    - Isolate Replication
    - Unique Domain Policy
    - NT domain
  - Step 2 Name and Domain Structure
    - Start with the Forest Root
    - Largest Domain left after splitting off the sub domains

Stage 2

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- Design of the Internal domain structure
  - Use organizational model to determine administrative control and GPO settings
  - Forest Root Domain should be designed first then move on to other trees
    - Consider the Hierarchical structure of your organization

Stage 2 cont...

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- OU’s should be used to manage your domain structure
  - Delegate administration
  - Easily organized by moving and renaming OU’s
- Designing Users and Groups
  - Groups only contain users or computers
  - User should be placed in the OU to which they correspond

Stage 3

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- Global Catalog Design
  - Universal groups have an impact on your GC placement
    - GC will be checked for Universal group membership every time a user logs in
  - Queries are much quicker with the GC than with querying the AD

Stage 3 cont...

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- Global Catalog Design cont...
  - The GC namespace is highly configurable
    - Most objects store at least one property in the GC
    - You can include or exclude any attributes in the GC using the Schema Master Plug-in
    - Decide if objects need to be searchable by the entire forest
    - Determine if you want to exclude any object class from the GC

Design Implications

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- One DC in each Site for each Domain in that site
- One GC should be placed in each site if your domain is in Native mode
  - Universal groups are expanded upon logon to check your group membership
- How many DC’s should you have
  - Dependant on server specifications, network speed, number of logons at peak time
  - Also dependant on the number of users

Design Implications cont...

MSTP

- Inter-Site Replication
  - Set schedule as needed
    - Ensure that windows match on both ends to ensure that replication can occur
  - Manually setup your site link
  - Let KCC do its job by setting up its own links
  - If you make your site links non-transitive, the KCC will use them but will not automatically create new links as it needs them

Design Implications cont...

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- IT Section
  - Current Ops
  - Infrastructure
- Finance
  - Pay role
  - Accounts
- Human Resources
- Marketing
- G6
  - Current Ops
  - Infrastructure
- G4
  - Logistics
  - Finance
- G3
- G2

OU’s or Domains?

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